



- New Column -

Probiotics, Enzymes and the Food Supply

by Mark A. Brudnak, PhD, ND

1817 Wisconsin Ave., Suite 140 • Grafton, Wisconsin 53024 USA • Fax 425-962-8342
Mark.Brudnak@alumni.usc.edu

Acrylamide in the Food Supply: Danger or Just Dander?

The headlines are abounding with it. One cannot open the paper these days without reading the horrors of our food supply (the 'common' food supply). Recently, acrylamide was found to be in a common (I'm afraid of getting sued so I won't mention them, but I am sure you can guess) 'french-fry.' As the original paper in *Science* came out, other food items were looked at, and rightly so.

So what? Is it a preservative or something similar to BHT that we have pretty much become accustomed to? Not really, Acrylamide is interesting for a number of reasons. I first came in contact with it as an undergraduate at the University of Southern California. It is common to use it in DNA sequencing gels and since I spent much of my time in molecular labs, I grew to know a lot about it.

In fact, I remember there being a sort of 'urban legend' about a renegade grad-student who hated all the pigeons on campus so he would soak French fries in acrylamide and feed them to the pigeons. Why? It is a potent carcinogen and potentially a potent neurotoxin. That is worth repeating because it doesn't take much to achieve those levels, it is a potent carcinogen and potentially potent neurotoxin.

I never actually saw this guy actually do it or even know who he was. I think it was more of a story made up to make us poignantly aware of the dangers in handling acrylamide. It basically comes in three forms. The first is powder. It is then liquefied in a hood, with gloves, lab-coat - the whole shebang. That is the second form, the third is even more pleasant, because a compound called Temed (Polymerization of acrylamide and bisacrylamide monomers is induced by ammonium persulfate (APS), which spontaneously decomposes to form free radicals. Temed, a free radical stabilizer, is generally included to promote polymerization. An even more potent carcinogen is added to polymerize the acrylamide into a tight gel. The gel is designed, or was, by nucleic acid scientists, to be able to separate out DNA fragments.

Here is an example of a headline that should give you shivers, especially if you have teenage children who worship fast food. In a letter to the FDA, published @ <http://www.cspinet.org/new/200206251.html>, the Center of Science in the Public Interest had this to say:

New Tests Confirm Acrylamide in American Foods

Snack Chips, French Fries Show Highest Levels Of Known Carcinogen - CSPI Calls On FDA To Test More Food. Popular American brands of snack chips and French fries contain

disturbingly high levels of acrylamide, according to new laboratory tests commissioned by the Center for Science in the Public Interest (CSPI). They published online some levels such as:

Acrylamide in Foods: Micrograms per Serving

Water, 8 oz., EPA limit	0.12
Boiled Potatoes, 4 oz.	<3
Old El Paso Taco Shells, 3, 1.1oz.	1
Ore Ida French Fries (uncooked), 3 oz.	5
Ore Ida French Fries (baked), 3 oz.	28
Honey Nut Cheerios, 1 oz.	6
Cheerios, 1 oz.	7
Tostitos Tortilla Chips, 1 oz.	5
Fritos Corn Chips, 1 oz.	11
Pringles Potato Crisps, 1 oz.	25
Wendy's French Fries, Biggie, 5.6 oz.	39
KFC Potato Wedges, Jumbo, 6.2 oz.	52
Burger King French Fries, large, 5.7 oz.	59
McDonald's French Fries, large, 6.2 oz.	82

Since they already published it I will be brave and reiterate the findings. I'm pretty sure I am not the only one who has eaten these things, thinking they were healthy. Well, not French fries, per se, but certainly Cheerios (they make heart health claims I believe, I wonder if they make acrylamide claims?)

Continuing, they said: "The amount of acrylamide in a large order of fast-food French fries is at least 300 times more than what the US Environmental Protection Agency allows in a glass of water." Acrylamide is sometimes used in water-treatment facilities. "I estimate that acrylamide causes several thousand cancers per year in Americans," said Clark University research professor Dale Hattis. Hattis, an expert in risk analysis, based his estimate on standard EPA projections of risks from animal studies and limited sampling of acrylamide levels in Swedish and American foods.

A California attorney has formally demanded that McDonald's and Burger King place a cancer warning on their French fries, as required by the state's Proposition 65. Burger King faces a legal deadline of late June and McDonald's of early July to respond.

I admit, when I first heard about the finding in French fries I was not too concerned. Then I looked into it a bit and called a few of my molecular biologist friends and their question was the same as mine. Is it polymerized? Which is

thought to be less toxic. This is the polyacrylamide form. We all pretty much agreed the jury was out, or was it? Looking through some information on this I found a curious site that suggests the WHO knew about this danger. <http://www.i-sis.org.uk/acrylamide.php>

They had this to say "Recently the World Health Organization (WHO) had a closed meeting to review the finding that cooked vegetables had significant levels of acrylamide.¹ The finding received worldwide attention because acrylamide is a potent nerve toxin in humans and also affects male reproduction, and causes birth defects and cancer in animals. The WHO press releases implied that the acrylamide finding was a surprise and that the pollutant probably arose from cooking the vegetables.

"Strangely, the WHO releases did not mention the fact that polyacrylamide is a well known additive to commercial herbicide mixtures (25% to 30% solutions) to reduce spray drift and to act as a surfactant.² The glyphosate (ie Roundup) herbicides of Monsanto Corporation are of particular concern because the herbicide interacts with the polymer.²⁻⁴ Experiments showed that heat and light contribute to the release of acrylamide from polyacrylamide, and glyphosate was found to influence the solubility of polyacrylamide, so care was advised in mixing the two."

I will give a few of the references I came across other than websites (which are somewhat notoriously slanted) for your further reading. However, I do think it is important to stress this is probably not a little issue but could, over time, be responsible for a large number of diseases and degenerative conditions. However, when the findings appeared in *Science*,

one of the premier journals of the world, it was a little hard to ignore. It would be interesting, talk about opening a can of worms, to assay the 'natural' product on the market. It might be revealing, and unpleasantly so.

I think it would be interesting to look at the ability of various probiotics to process and detoxify acrylamide and polyacrylamide. I am certain that strains can be converted to be high processors vs. low processors. It might make for an interesting product too. I know I would look for it. As I have written before about the ability of probiotics to detoxify things such as heavy metals, there is every reason to believe they could also detoxify acrylamide or at the very least, help carry it out of the body. I am willing to bet that a detox-probiotic will soon enter the market as it is such a natural.

While I spend a great deal of my time writing and consulting I do also work for a raw material supplier. I know how many competitors are out there and it honestly scares me to think of what might be in some of the products. I do think it should be an industry wide issue to set a limit on the level of acrylamide. However, headaches like that are why I keep my night job teaching martial arts.

References

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